



OF MARINE & ATMOSPHERIC SCIENCE

Fisheries Oceanography in the Virgin Islands: Preliminary Results from a Collaborative Research Endeavor

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5) NOAA Ship Nancy Foster

Sea Surface Chlorophyll-a

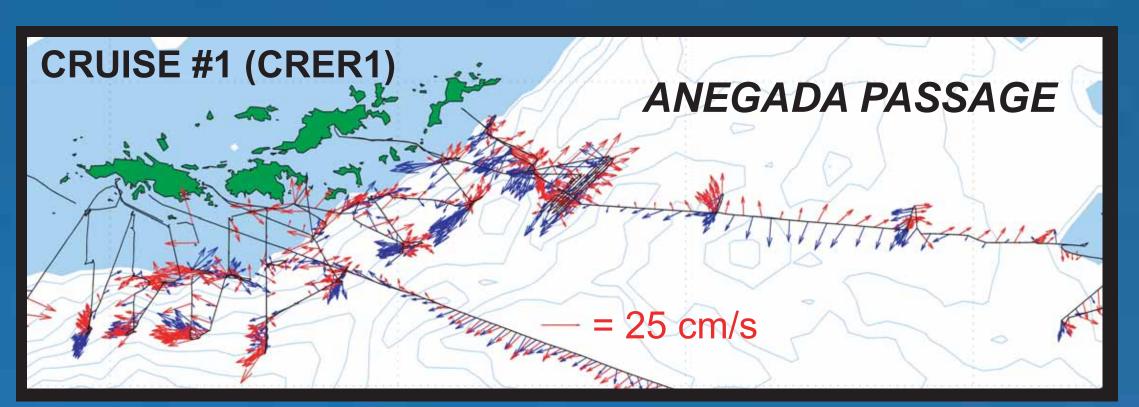
CRUISE #1 (CRER1)

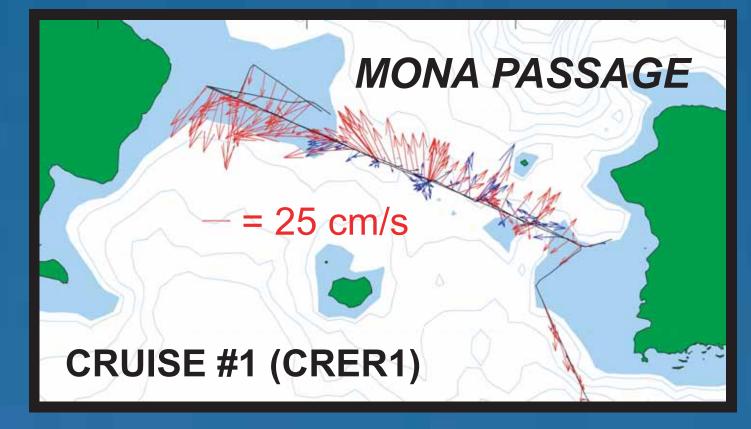
CRUISE #2 (CRER2)

March 11-24, 2008

March 28 - April 9, 2007

Nelson Melo, Estrella Malca, Akihiro Shiroza Cooperative Institute for Marine and Atmospheric Studies University of Miami, Miami, Florida





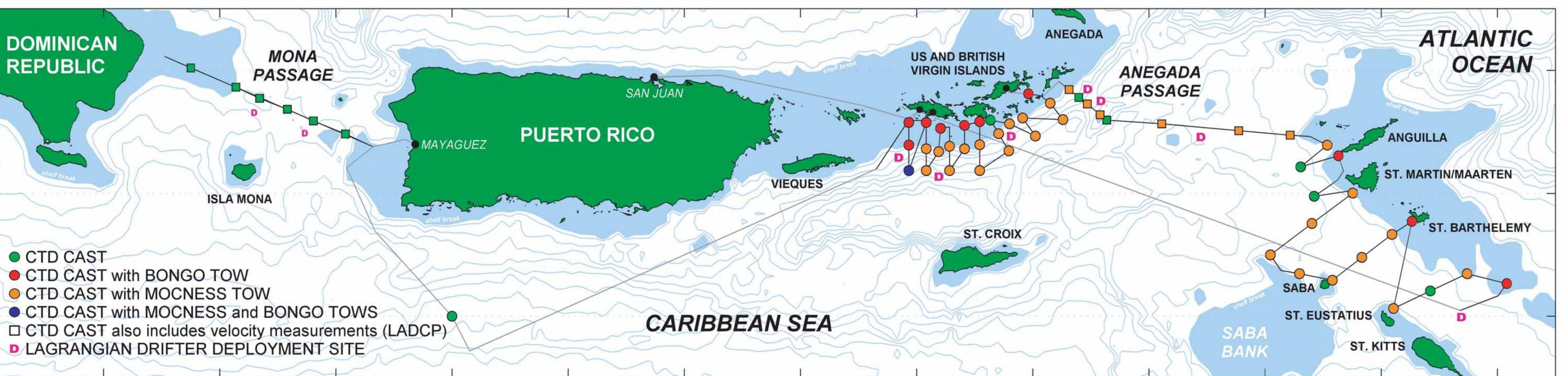
Overview and Motivation

A multi-species spawning aggregation located on the banks south of St. Thomas includes several economically important fish species, including dog snapper, yellowfin grouper, Nassau grouper, and tiger grouper Increased fishing pressure on these banks has prompted the Caribbean Fisheries Council to take actions such as seasonally closing fishing grounds and establishing Marine Protected Areas (MPAs). Due to a lack of biological and oceanographic data for the region, these management decisions have been based on professional judgment rather than scientific data.

In response to this situation, scientists from NOAA's Southeast Fisheries Science Center (SEFSC) and Meteorological Laboratory (AOML), and from the University of Miami's Cooperative stitute for Marine and Atmospheric Studies (CIMAS) began an interdisciplinary field study in the region in 2007. Research cruises utilize biological sampling techniques such as MOCNESS, neuston, and bongo trawl ows simultaneously with standard physical sampling methods such as CTD/LADCP casts, hull-mounted water velocity measurements, and Lagrangian drifter deployments. The three year project aims to determine how the unprotected banks of the Virgin Islands and surrounding region, the seasonally closed banks and MPAs, and near-shore areas are ecologically linked in terms of larval dispersal, transport, and life history patterns. collaboration should produce an assessment, based on scientific data, of the effectiveness of Caribbean Research Council management decisions and suggest modifications and improvements to current policy. Additionally, this project will also provide fisheries independent data, and develop ecological indices which can be integrated into stock assessment models.

Analysis of data gathered during the project's first research cruise is yielding preliminary results. A total of 26,809 fish larvae were collected from the Grammanik and Hind Banks and surrounding regions. Of this total, 585 Serranidae (grouper) and 93 Lutjanidae (snapper) larval specimens were collected. Typical sampling transects included near-shore, shelf-break, and offshore regimes. The most economically important species were recovered at the near-shore sites, south of St. Thomas, St. John, and British Virgin Islands as expected. Concurrent Lagrangian drifter trajectories and shipboard ADCP measurements showed a high degree of variability in regional surface water flow. Data from the project's second research cruise, conducted in March of 2008, are also presently being analyzed.

Completed Cruise Track, Station Locations, and Drifter Deployment Sites CORAL REEF ECOSYSTEM RESEARCH - CRUISE #1 (CRER1) - March 28 - April 9, 2007

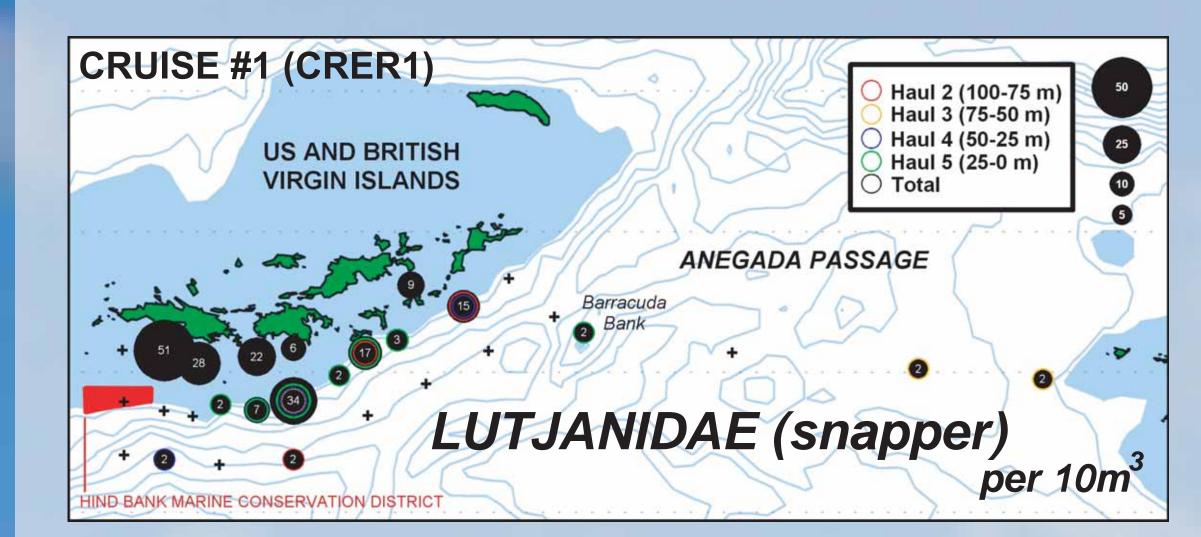


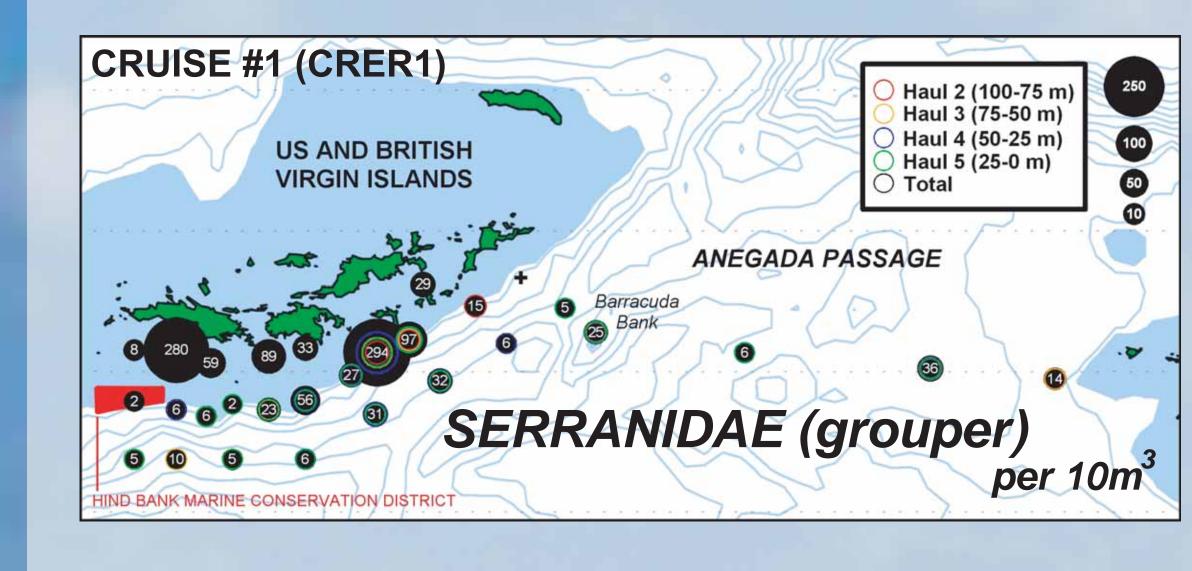
(NF0805) NOAA Ship Nancy Foster

ATLANTIC

OCEAN

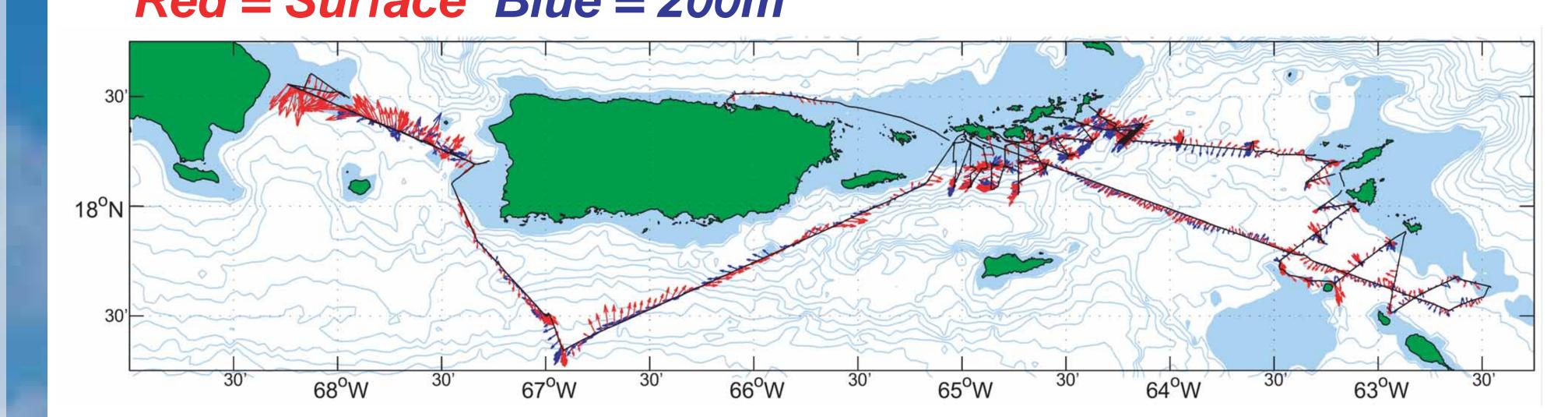
LUTJANIDAE (snapper) and SERRANIDAE (grouper) DISTRIBUTION AND ABUNDANCE

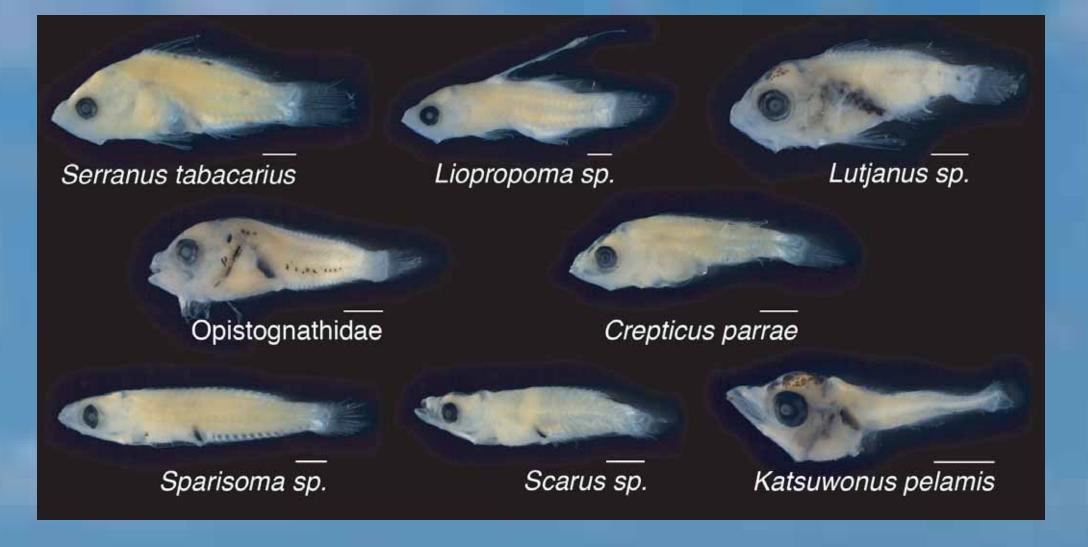


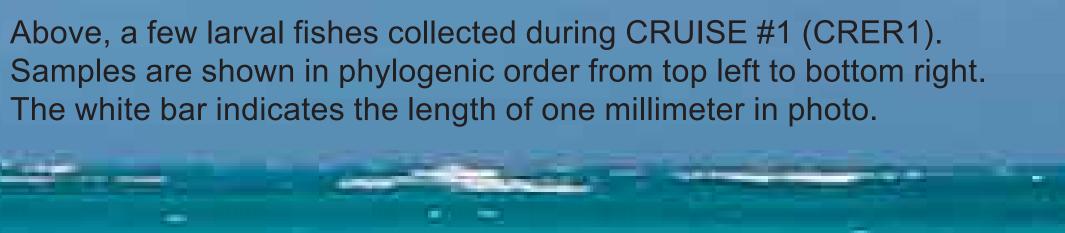


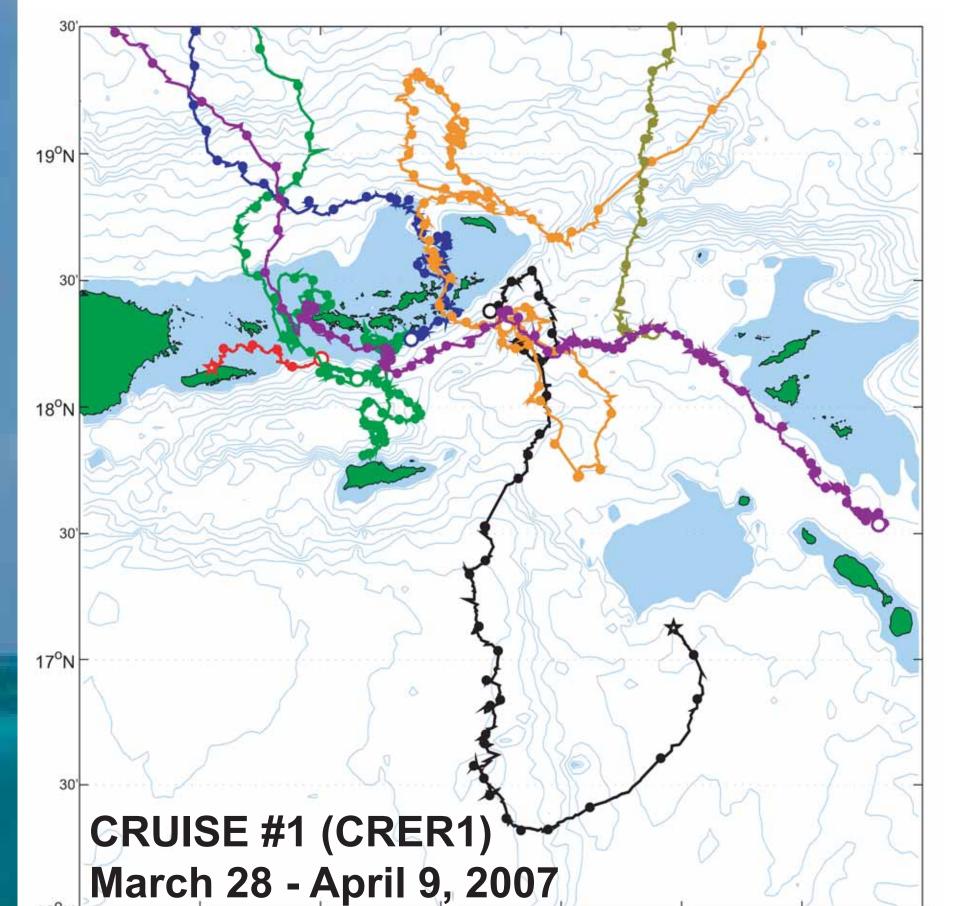
Stations with only solid black circles are bongo net tows (0.9m) taken inshore. Stations in deeper water with colors indicating hauls are MOCNESS tows collected from 100 meters to the surface at 25 meter intervals. Snapper larvae were abundant inshore and at one reef edge station. Few individuals were collected across the Anegada distribution of this group was more wide spread than the snapper, with consisten catches extending across Anegada Passage. Grouper were distributed across all depths but were most abundant in the 50-25 meter range.

Cruise #1 (CRER1) Hull-Mounted ADCP Velocity Vectors Red = Surface Blue = 200m



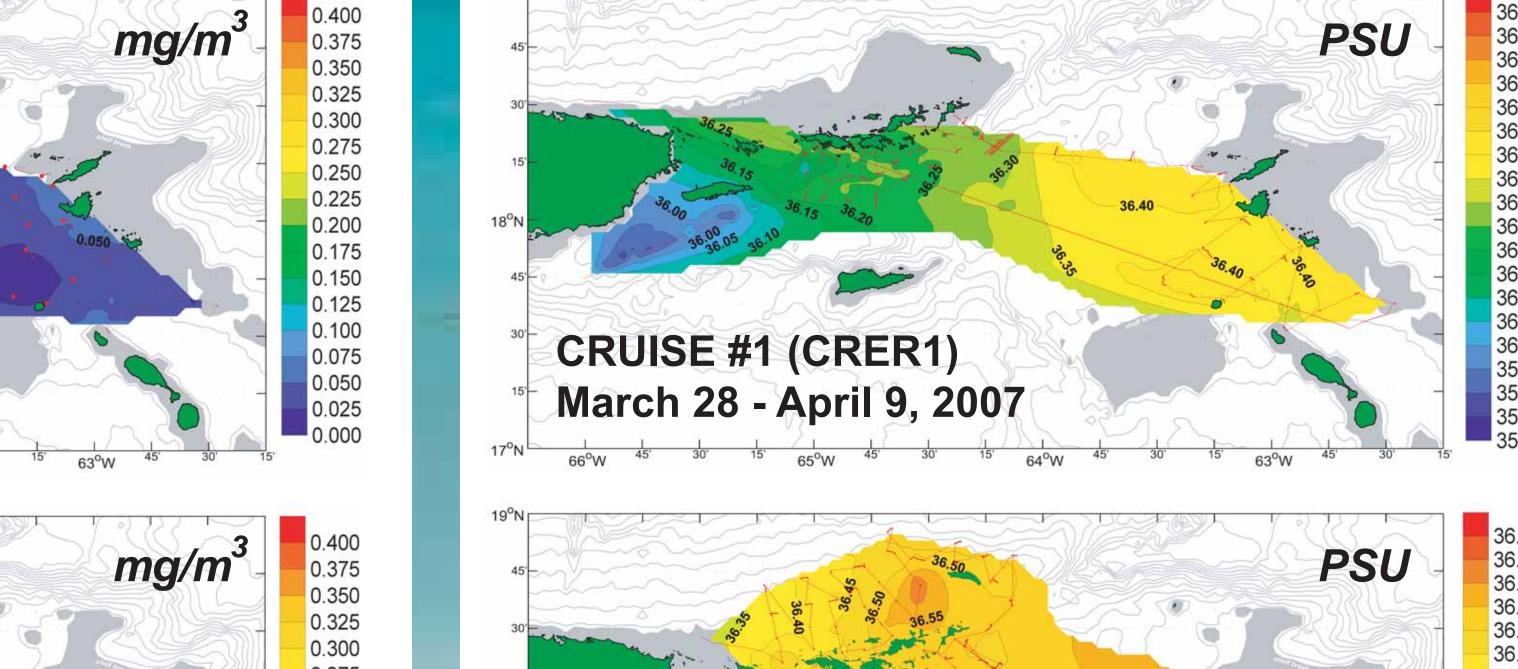


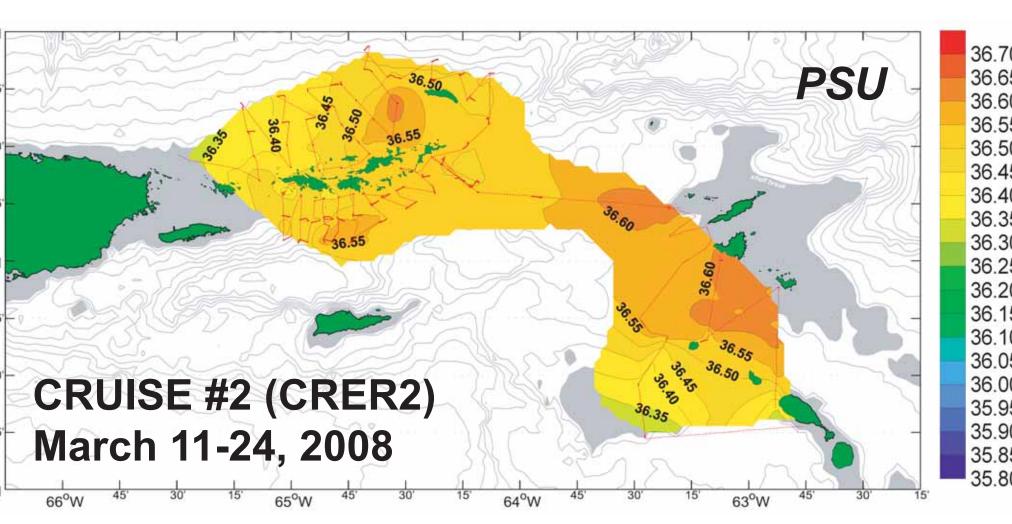




UISE #1 (CRER1) March 28 - April 9, 2007

Sea Surface Salinity

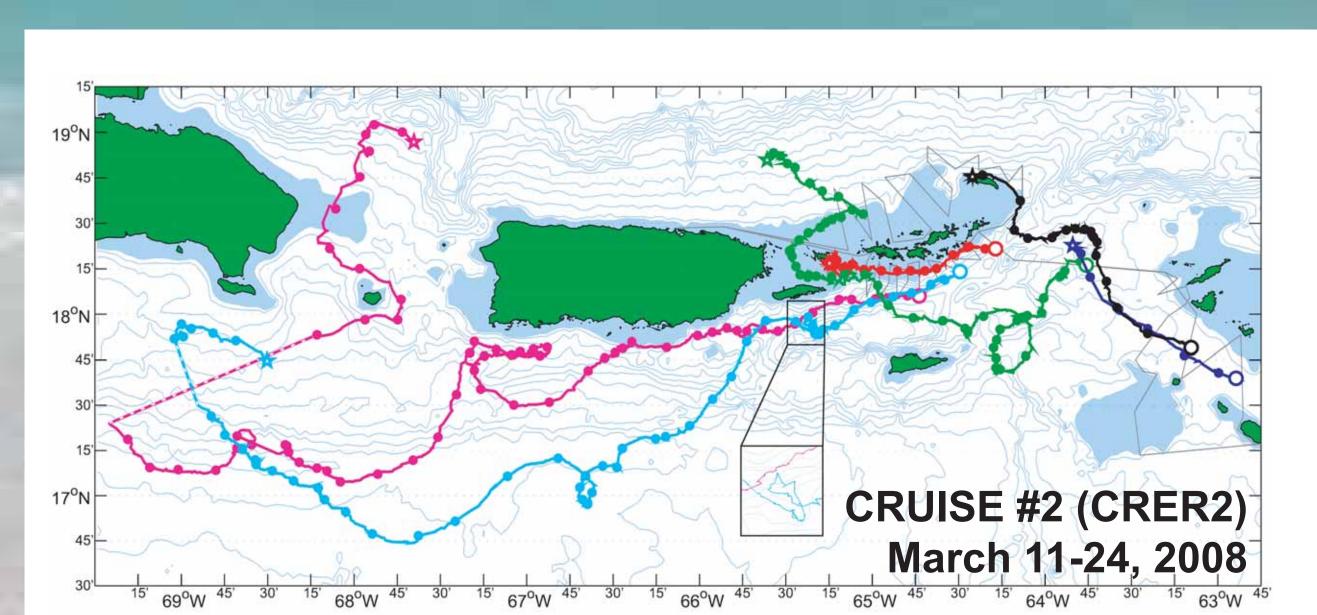




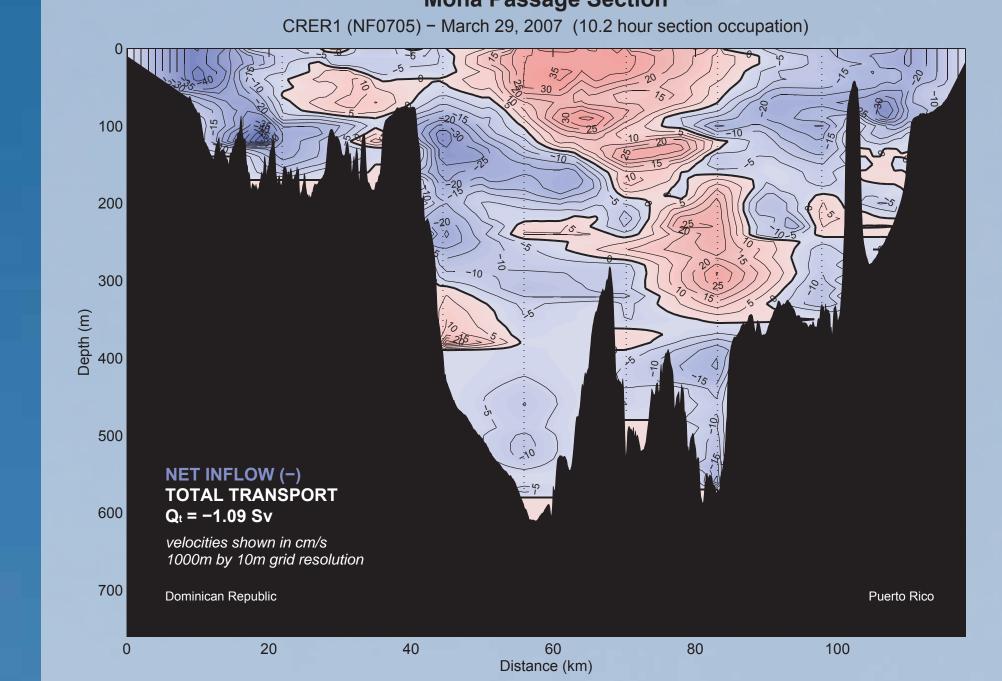
Continuous measurements of sea surface temperature, salinity, and chlorophyll-a were recorded via the Nancy Foster's shipboard flow-through system. Chlorophyll-a concentration and regional distribution is shown in the left panel. Sea surface salinity is shown on the right. Chlorophyll flow-through values were calibrated using extracted chlorophyll-a samples collected at CTD station locations.

atellite-tracked Lagrangian drifters were deployed during CRER1 and CRER2. In the upper right-hand panel, close-up of Anegada Passage and the Virgin Islands is ack are plotted approximately once every 24 hours.

panel below. Tracks are updated through mid 2008. A dotted line indicates a gap in the satellite data



Passage Transport Measurements: Mona Passage Anegada Passage



near-surface flow to calculate section transports for these two passages. During CRER2, the stations across Anegada Passage were occupied twice. These transports are shown below. March / April 2007 (CRER1) Mona Passage: 1.1 Sv INFLOW

In addition to CTD measurements and net tows,

a 300kHz Lowered Acoustic Doppler Current

hull-mounted ADCP measurements of the

and Anegada (CRER1 and CRER2) Passages.

water column velocity profiles were obtained using

Profiler (LADCP) at stations across Mona (CRER1)

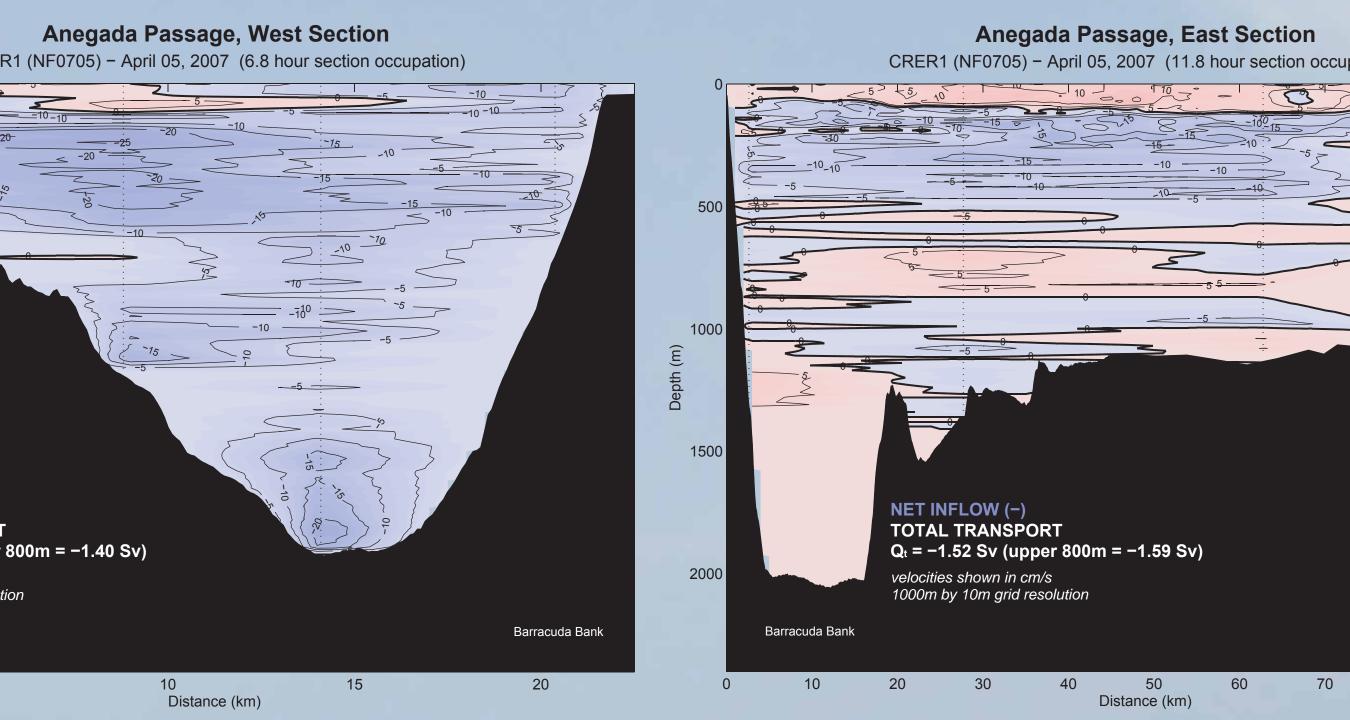
These LADCP data were combined with continuous

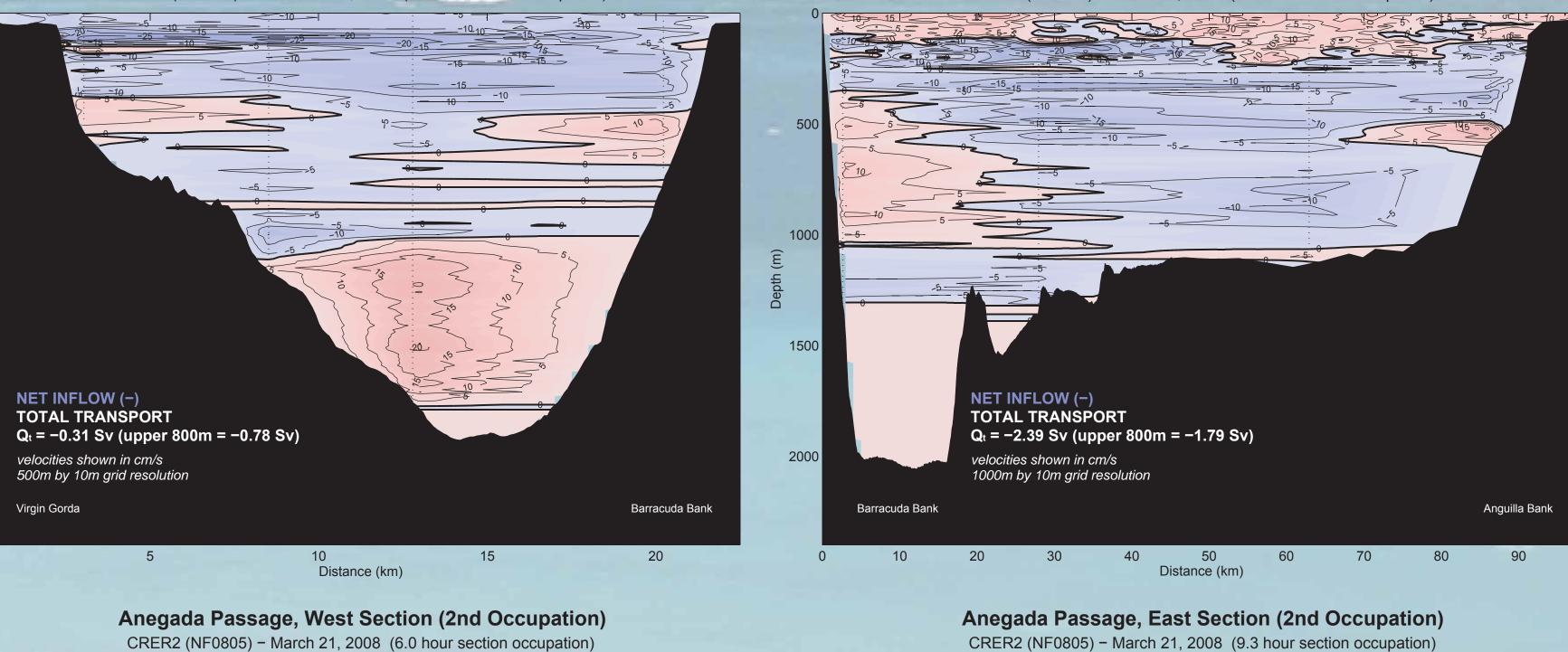
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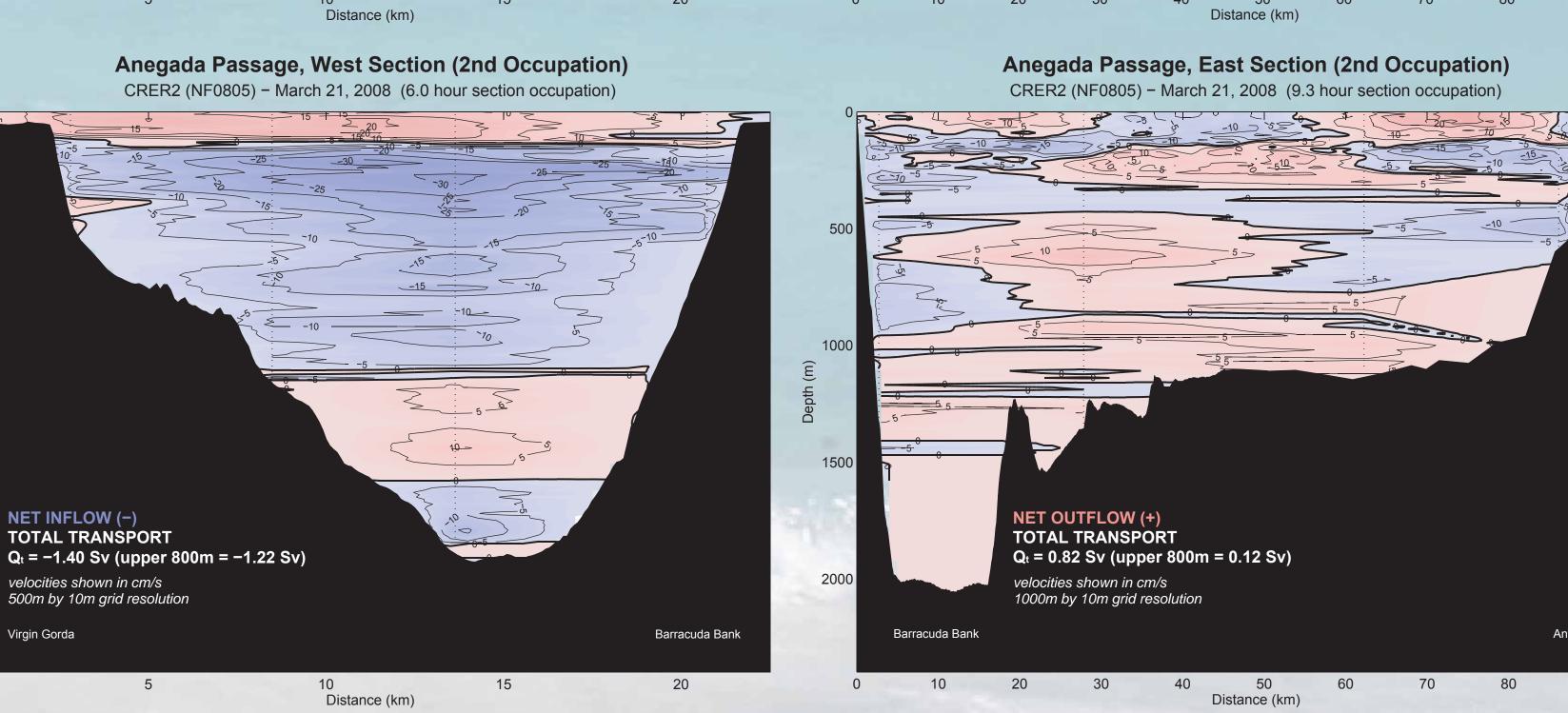
March 2008 (CRER2) Anegada Passage (1st occupation): 2.7 Sv *INFLOW* (2.6 Sv in the upper 800m) Anegada Passage (2nd occupation): 0.6 Sv INFLOW (1.1 Sv in the upper 800m)

3.5 Sv *INFLOW* (3.0 Sv in the upper 800m)

Anegada Passage:







SPECIAL THANKS TO: Roy Watlington and Kevin Brown of the University of the Virgin Islands AOML/SEFSC science team members: Grant Rawson, Barbara Muhling, Francisco Fuenmayor, Natasha Davis, and Anne Morgan The officers and crew of the NOAA Ship Nancy Foster

ST. BARTHELEMY ☐ CTD CAST also includes velocity measurements (LADCP) **BONGO TOW**

LAGRANGIAN DRIFTER DEPLOYMENT SITE Funding for this research is provided by NOAA.

Completed Cruise Track, Station Locations,

and Drifter Deployment Sites

CORAL REEF ECOSYSTEM RESEARCH

CRUISE #2 (CRER2) - March 11-24, 2008

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